MOUNTAIN LAKE

WATER COMPANY,

OF

SAN FRANCISCO.

CAPITAL STOCK, $500,000,

DIVIDED INTO 10,000 SHARES OF $50 EACH.

SAN FRANCISCO:

PRINTED AT THE CALIFORNIA COURIER OFFICE,

CORNER SANSOME AND JACKSON STS.

1851.

Officers and Directors

OF THE

MOUNTAIN LAKE WATER COMPANY.

Directors:

DAVID S. TURNER, BEVERLEY C. SANDERS,
ALEXANDER CROSS, HENRY HAIGHT,
GEORGE W. WRIGHT, EDWARD J. SAGE,
WILLIAM G. WOOD.

Officers:

DAVID S. TURNER,.....*President.*
HENRY HAIGHT,.....*Treasurer.*
PAGE, BACON & CO.,.....*Bankers.*
HENRY S. DEXTER,.....*Engineer.*
L. W. SLOAT,.....*Secretary.*

ORDINANCE NO. 167.

GRANTING TO AZRO D. MERRIFIELD, OR HIS ASSIGNS, THE PRIVILEGE TO INTRODUCE INTO THE CITY PURE FRESH WATER.

The people of the City of San Francisco do ordain as follows:

SEC. 1. That AZRO D. MERRIFIELD, or his assigns, be and are hereby authorised to lay down pipes through the streets of San Francisco for the conveyance of pure fresh water, for a term of twenty-five years, upon conditions hereinafter named.

The said pipes to be laid from a reservoir, constructed so as to contain not less than one million of gallons, and at an elevation of not less than fifty (50) feet above the intersection of Clay and Dupont Streets, and that the pipes leading from said reservoir, shall be equal to the discharge of said one million of gallons every twenty-four hours.

SEC. 2. Said AZRO D. MERRIFIELD, and his assigns, shall have the liberty of receiving from the inhabitants of the City of San Francisco, who may elect to take such water, rates of compensation to be fixed by a Board of three Commissioners, to be appointed annually by the Common Council. The first appointment of said commissioners to be made at the first regular meeting in the month of January, eighteen hundred and fifty-three, (1853) or sooner if the works are completed. The said commissioners to receive a salary from the city, which shall be established by the said Common Council, at the time of their appointment.

SEC. 3. Said AZRO D. MERRIFIELD and his assigns, shall in all cases replace the planking of the streets, and replace the earth of the streets not planked, after laying down the pipes, and shall leave the streets in as good condition as he finds them.

SEC. 4. The corporate authorities of the City of San Francisco, shall be entitled to the use of the water, for the purpose of extinguishing fires, and for hospital and prison purposes, without charge; and the said Common Council shall have the power, under the direction of the mayor and chief engineer, to tap the pipes and connect the same with hydrants, at such places as they may deem proper, and in case they shall require water for any other purpose, the commissioners provided for in section second of this ordinance, shall fix the rate of charge in the manner therein provided.

SEC. 5. Nothing herein contained shall be so construed as granting an exclusive privilege to said AZRO D. MERRIFIELD or assigns, or any other party; also, provided that nothing herein contained shall be so construed, as in any manner to recognise the claim or title of any person or persons to the spring or lake from which the water may be brought by the said MERRIFIELD, or to the land immediately around the same, or through which the pipes may be laid from the said lake or spring to the city.

SEC. 6. Provided further, that at the expiration of twenty-five (25) years, after the first day of January, eighteen hundred and fifty-three, (1853) the "water-works" entire shall be deeded to the City of San Francisco, by the said AZRO D. MERRIFIELD and his assigns and associates, in consideration of the privileges and benefits that may accrue to the said AZRO D. MERRIFIELD, his assigns and associates during such term of twenty-five years, from the aforesaid first of January, eighteen hundred and fifty-three, (1853) or to date from time of completion, provided it be sooner.

SEC. 7. The said AZRO D. MERRIFIELD, or assigns, shall give good and sufficient bonds in the sum of fifty thousand dollars to

the City of San Francisco, within thirty days after the passage of this ordinance, to be approved by the mayor and president of both boards of aldermen, that the said works shall be completed on or before the first day of January, eighteen hundred and fifty-three, (1853.)

R. S. DORR,
President of the Board of Aldermen.

JOSEPH F. ATWILL,
President of the Board of Assistant Aldermen.

Approved, June 11, 1851.

C. J. BRENHAM, *Mayor.*

Clerk's Office Board of Aldermen,
SAN FRANCISCO.

I hereby certify, that the foregoing is a true copy of the original ordinance, "Granting to Azro D. Merrifield, or his assigns, the privilege to introduce into the city pure and fresh water."

And that the bonds as required by said ordinance for the due completion of said water-works, have been given by Azro D. Merrifield, William G. Wood, Augustus Belknap, and Lorenzo Hubbard, and that the same were approved by the mayor, and by the presidents of both boards of aldermen, July 10, 1851, within thirty days after the passage of the ordinance.

{L. S.}

E. A. EDGERTON,
Clerk and Notary Public.

CERTIFICATE OF ASSOCIATION.

This is to Certify, that the subscribers hereto have, this fourteenth day of August, one thousand eight hundred and fifty-one, under and pursuant to the act of the legislature of the State of California, entitled "An Act concerning Corporations," passed April 22, 1850, associated themselves for the purpose of forming a company to introduce fresh water into the City of San Francisco, as follows:

First. The name of the company or association shall be "THE MOUNTAIN LAKE WATER COMPANY," and the place of its operations, shall be in the City and County of San Francisco.

Second. The capital of said company or association shall be *five hundred thousand dollars*, divided into ten thousand shares of fifty dollars each.

Third. The duration of said company or association, shall be twenty-five years from the day of the date hereof.

Fourth. The concerns of said company or association shall be managed by seven trustees or directors, and the trustees or directors for the first year shall be David S. Turner, Beverley C. Sanders, Geo. W. Wright, Henry Haight, Alexander Cross, Edward J. Sage and William G. Wood, who shall hold their offices, until their successors are qualified.

WILLIAM G. WOOD,
AUGUSTUS BELKNAP,
LORENZO HUBBARD.

STATE OF CALIFORNIA,
County of San Francisco. } *ss.*

On this fourteenth day of August, A. D., 1851, before me came William G. Wood, Augustus Belknap and Lorenzo Hubbard, to me personally known to be the individuals described in and who executed the within instrument, and acknowledged that they executed the same freely and voluntarily for the uses and purposes therein mentioned.

In witness whereof, I have hereunto set my hand and affixed my official seal, in the City of San Francisco, the day and year first above written.

{L.S.}

L. W. SLOAT,
Notary Public.

ENGINEER'S REPORT.

To the President of the San Francisco Water-works Company:

SIR,—In accordance with the request of the directors of your company, I have surveyed the lagoon or small lake from which you propose to draw a supply of water for the city, and have found the below-mentioned results. Before entering upon the details of my report, I beg leave to premise by saying that I have rather under estimated than over stated the supply of water, my object being to raise no expectation that could not be realized under the most favorable circumstances.

The Lagoon, or Mountain Lake, as it has sometimes been called, is situated just beyond the range of hills west of the Presidio, and is distant from the city, in a right line, about three and a half miles. Its present surface is one hundred and twenty-three feet above tide water. It has an area of seven and a half acres, and an average depth of water of sixteen feet. The deepest place in it being twenty feet. The Lagoon is evidently eight feet lower than it has been, or was, as I was informed by persons living in the vicinity, two years ago. When full, its surface covers an area of ten and a quarter acres, and has a depth of water averaging about twenty-four feet.

It is situated in such a manner as to receive the drainage of a considerable extent of country, and in a wet season must fill rapidly. But during the last winter it rather lowered than raised. In summer its sources of supply are wholly from springs,

which, for the greater part, are below the surface. Immediately in the vicinity of the lake there is no visible outlet, it being entirely surrounded by hills of greater or less height. The first indication of an outlet, is seen in a ravine at a point about three hundred yards from what may be termed the foot of the lake; which point is also thirty-five feet below the present surface, and about nineteen feet below the bottom of the lake. The ravine is clearly defined from the lake to the outer bay, into which the waters flowing through it are discharged. The ravine is about three quarters of a mile long, and has an average width at bottom of about one hundred yards. The hills skirting it are higher than the lake, and the earth of which they are composed is sand and sandy loam. The highest point of the dividing ridge, between the lake and the head of the ravine, is eighteen feet above the present surface of the water. It is beneath and through this dividing ridge, that it is supposed the waters of the lake percolate, and form the rapid brook, which, having its origin in the ravine as before mentioned, falls into the outer bay. I fully coincide in the opinion of nearly all who have examined the lake and surrounding country, that this brook is the outlet, and that the waters it discharges are almost wholly drawn from the lake.

To intercept and cut off this discharge of water is absolutely necessary to the success of your contemplated enterprise, and with the fullest confidence in its entire practicability, I have no hesitation in assuring you that it can be done, subject only to the usual contingencies attending works of the sort. My surveys and examinations are, as yet, too limited for me to recommend any of the various plans which suggest themselves to effect this object. But before taking leave of this branch of the subject, I remark that it can be done by cutting trenches across the ravine, at such points as a careful examination indicates; and filling them with an impervious material, or by forming an artificial reservoir, by erecting a water tight embankment, at the proper

site, across the ravine, by which two reservoirs will be formed, the lake being one, with a natural filter between them.

The water of both lake and outlet is pure and soft, and I have no doubt but that an analysis will show it to be not inferior to the water of the Sacramento River. The hills surrounding the lake being sand and sandy loam, there is little hazard in assuming that its waters will continue to be as clear as they now are, during the rainy season.

The outlet discharges daily, - -	3,000,000 galls.
The lake now contains, - - - -	36,500,000 "
When full it contains, - - -	58,000,000 "

The bottom of the lake is on an available average, as regards a supply of water, one hundred and seven feet above tide-water. Stockton Street, at the intersection of the following streets, is as stated below, above tide water: namely, at Broadway, 89 feet; Pacific, 87 feet; Jackson, 99 feet; Washington, 109 ft.; Clay, 125 ft.; Sacramento, 125 ft. The grade on California, Pine and Bush Streets, has not yet been established.

The surface of the lake, at present, is one hundred and twenty-three feet above tide-water. By cutting off the discharge, the present level of its surface might be retained, after supplying the city with from two to three million gallons of water, daily.

From the foregoing, it will be seen that the lake is sufficiently elevated to supply all that portion of the city lying below the level of Stockton Street, without employing machinery to elevate its waters. Should the company carry into execution its plan for supplying the city with water, the most careful and minute surveys will be necessary, and until these are made, it is better, in my judgment, to leave the details of the work open—a general plan being sufficiently accurate as a basis to estimate the expense of the enterprise.

Mr. Merrifield, to whom the credit of originating the project belongs, presented the following estimate of the expense upon the

plan recommended by him. He describes his plan in the following words:

"The water is to be raised from the lake by means of two engines of one hundred and fifty horse power each, and carried through two pipes of fourteen inches bore—a distance of about seven thousand five hundred feet, in a direct line towards the city, to the reservoir and raised in that distance, thirty-eight inches in every hundred feet; thus making the height of the reservoir, three hundred and ninety-three feet above tide-water, being more than sufficient to carry water into dwellings on any of the hills surrounding the city. The reservoir will be two hundred feet square and ten feet deep, and so constructed that it can be enlarged at small expense. It will contain two million of gallons, and can be filled by the power proposed in twelve hours. From the reservoir a main pipe of twenty inches bore to be laid to the city, as far as Stockton Street, and then along the entire length of Stockton Street, a distance of fourteen thousand feet. From this main pipe a distributing pipe is to be laid of eight inches bore. The entire distance of the streets now regulated being about thirty thousand feet, or nearly six miles."

The quantity of pipe necessary, he estimates at 5,193,170 lbs, at a cost, delivered, of eighty dollars per ton. He makes the following estimate, namely:

"Cost of pipe, delivered here,	$225,000.
Laying the same,	50,000.
Ditching, grading, &c.,	20,000.
Reservoir,	100,000.
Buildings for machinery,	10,000.
Engines, machinery, etc.,	50,000.
Total cost,	$455,000."

The length of streets embraced within an area, bounded as follows: north, by Broadway; east, by Battery Street; south,

by Bush Street, and west, by Stockton Street, is 37,611 feet, and after allowing for the wharves of the city, the distance is 41,245 feet. The weight of pipe necessary for this distance, is as follows:

For a pipe of six inches bore and half inch thick, 1,312,416 pounds; five-eights of an inch thick, 1,672,897 pounds; three-fourths of an inch thick, 2,045,752 pounds. For a pipe twelve inches bore and three-fourths of an inch thick, 3,864,656; for a pipe seven-eights of an inch thick, 4,556,747; for a pipe one inch thick, 5,255,437 pounds. It is of course understood, that the strength of pipe and consequent thickness, is determined by the pressure it is to sustain.

Mr. Merrifield's estimate appears to me to be a fair one, but I should add to it the usual ten per ct. for contingencies, making the cost of the work on his plan, $500,000.

Your company not being fully organized, and the means of placing a party of engineers in the field not having been furnished me, I cannot, of course, furnish you with an estimate of the expense of bringing the water into the city by laying pipes from the lake to the city, in such manner as to convey its waters without the use of any machinery, whatever.

But I have no doubt, that the expense will not exceed the amount estimated by Mr. Merrifield on the plan proposed by him. Should it, however, prove to be more expensive in the first outlay of capital, a large daily expenditure will be saved in the cost of running two steam engines, and working from two to four pumps to force water two hundred and forty-one feet high into the receiving reservoir.

Perhaps, I cannot convey to you a better idea of the average quantity of water necessary for the supply of a city, than by copying the following table of the actual operations of the eight companies which furnish London with water.

A TABLE

SHOWING THE NUMBER OF HOUSES SUPPLIED BY THE WATER COMPANIES OF LONDON, &c., ACCORDING TO RETURNS MADE TO PARLIAMENT IN 1834.

Name of Company.	Number of houses supplied.	Gross annual income.	Average annual expenses.	Height of supply above the shares.	Average daily supply to each house.	Average charge for water per house.	Amount of capital employed.	Average value of each share.	Profit per cent. on the capital.
				Feet.	*galls*	£ s. d.		£ s. d.	£ s. d.
New River,	73,212	£104,909	£38,000	145	241	1 6 6	£1,116,964	15,512 0 0	4 0 0
Chelsea,	13,891	22,906	13,481	135	168	1 13 3	271,311	56 10 6	1 15 0
West Middlesex,	16,000	45,500	18,000	155	185	2 16 10	404,263	68 8 9	3 0 0
Grand Junction,	11,140	26,154	11,000	152	350	2 8 6	334,174	60 4 3	2 10 0
East London,	46,421	45,234	15,889	107	120	1 2 9	594,988	118 19 11	3 15 0
South London,	12,046	8,839	4,000	80	100	15 0	245,306	98 0 0	2 0 0
Lambeth,	16,682	14,808	6,500	185	124	17 0	182,553	144 17 8	2 2 6
Southwark,	7,100	7,850	no return.	60	156	1 1 3	95,000	One person's property.	No return.

Average supply to each house, 187¼ gallons.

It will be seen that the average supply for London, including public buildings, breweries, distilleries, etc., is one hundred and eighty-seven and a quarter gallons daily, per house.

Assuming five thousand buildings to be supplied with two hundred gallons daily, gives one million as the daily supply. If the company can sell double that quantity, so much the better for the shareholders, as the lake, beyond a doubt, in my judgment, can furnish throughout the year, two million gallons daily.

It is, perhaps, unnecessary for me to make any estimate of the probable income, but the following figures may not be beyond the reality of two years' experience:

For the year 1852, 3,000 houses, at $10 per month each, gross income, - - - - - -	$360,000.
For 1853, 5,000 houses, at $10 per month, - - -	600,000.
Total, - - - - - - -	$960,000.
Deduct one-third for expenses, without machinery,	320,000.
Profit in two years, - - - - -	$640,000.

Or, if machinery is used, deducting sixty per cent. of gross income for expenses, leaves $384,000 for dividends.

In closing my report, I beg leave to state that I have abridged it as much as was possible, consistently with a full statement of facts so far as I have determined them, and that knowing the deep interest every citizen must take in supplying the city with water, I have aimed to be cautiously accurate in the statement of the physical features of the enterprise.

All of which is respectfully submitted.

HENRY S. DEXTER,
Engineer to the Company.